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HEO 151T.01: Service and Maintenance

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**THE UNIVERSITY OF MONTANA MISSOULA
COLLEGE OF TECHNOLOGY
INDUSTRIAL TECHNOLOGY DEPARTMENT**

COURSE SYLLABUS

COURSE NUMBER AND TITLE: HEO151T SERVICE AND MAINTENANCE

DATE REVISED: Fall 2003

SEMESTER CREDITS: 2

CONTACT HOURS PER SEMESTER: 75

Lecture hours per week	1
Lab hours per week	2
Shop hours per week	2

PREREQUISITES: None

INSTRUCTOR NAME:	Tim Lytle
E-MAIL ADDRESS:	Tim.Lytle@mso.umt.edu
PHONE NUMBER :	406-243-7643
OFFICE LOCATION :	West Campus 3639 South Avenue West
OFFICE HOURS:	Regular

RELATIONSHIP TO PROGRAM

Develop student's knowledge and understanding of mechanical skills needed for light-duty maintenance and service as well as basic mechanical skills necessary to identify major components and their functions and prepare the program's equipment for field activities.

COURSE DESCRIPTION:

(First half) A study of types of lubricants and their use; the importance and procedures of scheduled and preventive maintenance; safety stands and requirements. (Second half) Basic principals of diesel and gas engines, hydraulics, power trains, undercarriages, and other heavy equipment components.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives Life-Long Learning Skill Codes*

Upon completion of this course, the student will be able to:

1. Read, understand, utilize various service BSKL 1,3; THINK 2,6 INFO 1

- | | |
|--|---|
| 2. Perform service and maintenance safety | THINK 2,4,6 |
| 3. Complete service reports | BSKL 1,2; INFO 1,2,3 |
| 4. Work as part of a service team | BSKL4,5;PQ1,2;IPS 1,3,4,5
THINK 2,3;RSRC 1,3 |
| 5. Identify major mechanical components and their function | BSKL 1,2;INFO1,2,3 |
| 6. Identify and correct minor mechanical malfunctions | THINK 1,2,3,6;INFO1,2,3
SYS 1,2;TECH 1,3 |

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grade:	93% - 100% = A
	85% - 92% = B
	75% - 84% = C
	65% - 74% = D
	64% below = F

Grades will be determined by the following:

Lab	40%
Tests	20%
Attendance	20%
Participation	20%

Note:

1. No excuses for absence or late attendance.
2. Missed tests, quizzes, and homework will result in a 0% grade.
No make-ups.
3. Please bring your hard hat, safety vest, and safety glasses with you to every class. You cannot attend class without them. Coveralls are recommended but not required.

OTHER POLICIES:

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Student course evaluations.
2. Student field performance spring quarter.
3. Program directors evaluation of student performance

REQUIRED TEXT: Machine operator's manuals (used in HEO146)

SUGGESTED REFERENCE MATERIALS:

Supplies:

1. Hard Hat
2. Safety Vest
3. Safety Glasses

COURSE OUTLINE: (1st Half)

1. Introduction to service
 - A. Safety procedures
 1. Equipment
 2. Location
 3. Shop rules
 4. Blocking equipment
 - B. Service Manuals
 1. Periodic service
 2. Maintenance procedures
 3. Service area locations
 - C. Oils and fluids
 1. Engine
 2. Transmission (manual and powershift)
 3. Hydraulic
 4. Differentials and final drives
 5. Brakes
 6. Power steering
 - D. Filters
 1. Oil
 2. Air
 3. Hydraulic
 4. Fuel
 5. Coolant
 6. Transmission
 7. Final drive
 - E. Cooling systems
 1. Coolants and radiators
 2. Oil Coolers
 3. Transmission coolers
 4. Air coolers
 - F. Electrical systems
 1. Safety
 2. Batteries
 3. Starters
 4. Alternators/generators

- 5. Lights/special equipment
- G. Miscellaneous
 - 1. Tires
 - 2. Tracks
 - 3. Maintenance w/o service manuals (rules of thumb)

II. Service of all equipment

- A. Usage and hours of machine
 - 1. 10 hour service
 - 2. 200 hour service
 - 3. 500/1000 hour service
- B. Cleaning of equipment
- C. Hand and power tools
 - 1. Safety
 - 2. Wrenches
 - 3. Impact tools
 - 4. Hammers
 - 5. Chisels
 - 6. Drills
 - 7. Grinders
- D. Oil filter change
 - 1. Tools
 - 2. Procedures
- E. Hydraulic service
 - 1. Tools
 - 2. Procedures
- F. Power train service
 - 1. Tools
 - 2. Procedures
 - 3. Zerk fittings
 - 4. Grease guns
 - 5. Air brake service

III. Periodic adjustments

- A. Clutches
- B. Belts
- C. Track adjustment
- D. Wheels and tire pressures
- E. Control linkage

IV. Service for specific equipment

- A. TD15 dozer, TS14 Scraper, W24C End Loaders; 310A Backhoe, T500M Grader; 710-A Grader, Dump Trucks, 613 Scraper; MRS 14 Scraper; Vibratory Roller, HEO Support Vehicles.

COURSE OUTLINE: (2ND half)

I. Fundamentals of heavy equipment

- A. Using operator, parts, service and maintenance manuals
- B. Principles of gasoline engines
- C. Diesel engine principles
- D. Power train principles
- E. Hydraulic system principles
- F. Electrical system principles

II. Component identification and inspection

- A. Engines
- B. Starters
- C. Alternators
- D. Pumps
 - 1. Water
 - 2. Power steering
 - 3. Fuel
- E. Transmissions
- F. Differentials
- G. Drive lines
- H. Brake systems
- I. Hydraulic systems
- J. Cutting edge and teeth replacement
- K. Undercarriages

III. Equipment services and repair

- A. Dependent on needed repairs of equipment – will vary from year to year.
- B. Every student will receive basic, hands-on knowledge of engines, Power trains, starters, transmissions, differentials, and hydraulic systems.